CLAIMS

We claim as our invention:

1.   A method for predicting a golfer's ball striking performance, the method comprising:

determining a plurality of pre-impact swing properties for the golfer based on the golfer's swing with a first golf club, the plurality of pre-impact swing properties including an impact location and an angular velocity, a linear velocity and an orientation of a golf club head;

generating a plurality of ball launch parameters from a plurality of club head properties of the first golf club, a plurality of ball properties of a first golf ball, and the plurality of pre-impact swing properties, the plurality of club head properties including a plurality of face properties and a plurality of mass properties, the plurality of ball properties including a mass, a radius, a moment of inertia and a coefficient of restitution of the golf ball;

imputing into a trajectory code the plurality of ball launch parameters, a plurality of first atmospheric conditions, and a plurality of lift and drag properties for the first golf ball; and

generating a predicted performance from the trajectory code of the first golf ball if struck with the first golf club by the golfer under the first atmospheric conditions.

2.   The method according to claim 1, wherein the plurality of face properties includes a face geometry, a face center, a bulge radius and a roll radius, and wherein the plurality of mass properties includes an inertial tensor, a mass of the club head and a center of gravity location.

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3.   The method according to claim 1, wherein the plurality of ball launch parameters includes a ball speed, linear and angular velocities, launch and side angles of the golf ball, a ball spin and a spin axis of the golf ball.

4.   The method according to claim 1, wherein generating the predicted performance includes predicting a trajectory shape, a trajectory apex, flight and roll distances of the golf ball, and a dispersion of the golf ball.

5.   The method according to claim 1, further comprising:

inputting into the trajectory code the plurality of ball launch parameters, a plurality of second atmospheric conditions, and the plurality of lift and drag properties for the first ball; and

generating a predicted performance from the trajectory code of the first golf ball if struck by the golfer with the first golf club under the second atmospheric conditions.

6.   The method according to claim 1, further comprising:

generating a second plurality of ball launch parameters from a plurality of club head properties of a second golf club, the plurality of ball properties of the first golf ball, and the plurality of pre-impact swing properties;

inputting into the trajectory code the second plurality of ball launch parameters, the plurality of lift and drag properties for the first golf ball, and a subset of atmospheric conditions selected from a set of atmospheric conditions that includes at least a first subset

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comprised of the plurality of first atmospheric conditions and a second subset comprised of a plurality of second atmospheric conditions; and

generating a predicted performance from the trajectory code of the first golf ball if struck by the golfer with the second golf club under the selected subset of atmospheric conditions.

7.   The method according to claim 1, further comprising:

generating a second plurality of ball launch parameters from the plurality of club head properties of the first golf club, a plurality of ball properties of a second golf ball, and the plurality of pre-impact swing properties;

inputting into the trajectory code the second plurality of ball launch parameters, a plurality of lift and drag properties for the second golf ball, and a subset of atmospheric conditions selected from a set of atmospheric conditions that includes at least a first subset comprised of the plurality of first atmospheric conditions and a second subset comprised of a plurality of second atmospheric conditions; and

generating a predicted performance from the trajectory code of the second golf ball if struck by the golfer with the first golf club under the selected subset of atmospheric conditions.

8.   The method according to claim 1, further comprising:

generating a second plurality of ball launch parameters from a plurality of club head properties of a second golf club, a plurality of ball properties of a second golf ball, and the

plurality of pre-impact swing properties;

inputting into the trajectory code the second plurality of ball launch parameters, a

plurality of lift and drag properties for the second golf ball, and a subset of atmospheric

conditions selected from a set of atmospheric conditions that includes at least a first subset

comprised of the plurality of first atmospheric conditions and a second subset comprised of a

plurality of second atmospheric conditions; and

generating a predicted performance from the trajectory code of the second golf

ball if struck by the golfer with the second golf club under the selected subset of atmospheric

conditions.